

## Abstract

It is intended to provide a proton conducting membrane which is excellent in heat resistance, dimensional stability, fuel barrier properties, flexibility, etc. and exhibits an excellent protonic conductivity even at high temperatures, a method of producing same and a fuel cell which can operate stably at high temperatures, the proton conducting membrane of the present invention comprises a support filled with a proton conducting structure ( $\beta$ ) comprising an acid-containing structure containing an acid group, which support being made of an organic-inorganic composite structure ( $\alpha$ ) having a crosslinked structure formed by a metal-oxygen bond and an open-cell structure having internally-formed pores connected continuously to each other by the crosslinked structure, and the use of this proton conducting membrane makes it possible to obtain a fuel cell having an excellent performance.